## REMARKS

Claims 16-32 are pending and under examination. Applicants respectfully traverse the objection and rejection made in the Office Action, wherein the Examiner:

(1) rejected claims 16-20, 23, 24, and 31 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent App. Pub. No. 2005/0007642 ("*McGhan*");

(2) objected to claims 21 and 22 as being dependent upon a rejected base claim, but indicated that they would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims; and

(3) allowed claims 25-30 and 32.

**Rejection of Claims 16-20, 23, 24, and 31 under 35 U.S.C. § 103(a):**

Applicants request reconsideration and withdrawal of the rejection of claims 16-20, 23, 24, and 31 under 35 U.S.C. § 103(a) as being unpatentable over *McGhan*.

Specifically, *McGhan* fails to disclose or suggest "wherein each of said optical pulses has a respective optical phase value related to said modulation signal; and applying to each of said optical pulses a respective phase-shift, each respective phase shift having a substantially equal magnitude, each respective phase shift having a sign determined as a function of the respective optical phase value," as recited in independent claim 16 (emphases added, claim 24 containing similar recitations).

The Office Action alleged that the stream of pulses shown in Fig. 5a and the cascaded phase shifter 22 in Fig. 2b of *McGhan* render the above-quoted features obvious. *See* Office Action, pages 2-3. This allegation is incorrect.

First, the phase shifter 22 disclosed by *McGhan* receives its input from an MZ modulator 4 that is driven by the $V_A(t)$ voltage (identified as $V_S(t)$ in paragraph [0011] of *McGhan*). *See McGhan*, Fig. 2b. According to *McGhan*, $V_S(t)$ is the amplitude component of

the drive signals 10. *See McGhan*, paragraph [0011]. *McGhan* further discloses that "[t]he amplitude component $V_S(t)$ (which may be represented by a single signal or a differential signal pair) drives the MZ modulator 4 to modulate the *amplitude* of the CW carrier signal 6 in a conventional manner." *McGhan*, paragraph [0012] (emphasis added). Therefore, the MZ modulator 4 in the embodiment of Fig. 2b does not produce a phase shift keyed optical signal and thus cannot constitute the claimed "each of said optical pulses has a respective optical phase value related to said modulation signal," as recited in claim 16, at least because the MZ modulator 4 does not produce a "related" phase value (or any phase value at all). As a result, the phase shifter 22 receives signals that are only amplitude-modulated. Such signals cannot constitute the claimed "said optical pulses," because they are not phase shift keyed signals.

Second, *McGhan* merely discloses a phase shifter cascaded with a modulator, without specifying any particular method of operation of the phase shifter such as those recited in claim 16, or any properties of the resulting phase shift itself. Such teaching of applying an arbitrary phase shift to a previously modulated signal cannot render claim 16 obvious at least because in *McGhan*, there is no disclosure of, for example, the claimed "each respective phase shift having a substantially equal magnitude, each respective phase shift having a sign determined as a function of the respective optical phase value," as recited in claim 16.

In contrast, *McGhan* only teaches resolving a desired modulation into components and applying those two components via separate modulators. *See, e.g.*, *McGhan*, Fig. 2b and paragraph [0011]. In addition, *McGhan* addresses the problem that prior art systems "are designed to modulate only a single dimension (i.e. amplitude or phase) of the CW optical carrier signal 6 generated by the narrow-band laser 2. However, in some instances it is desirable to modulate two or more dimensions of the CW carrier 6." *McGhan*, paragraph [0009]. *McGhan*'s

technique "enables arbitrary E-field modulation of the CW carrier throughout the complex polar-coordinate (Amplitude-Phase) plane." *McGhan*, paragraph [0011]. *McGhan* is therefore designed to produce arbitrary modulations of an optical signal, but does not disclose or render obvious any particular modulation or modulation method. *McGhan* makes no mention of what particular modulations would be desired, and in particular *McGhan* does not teach or render obvious the claimed modulation method.

Third, the driving voltage $V_\phi(t)$ of *McGhan*'s phase shifter 22 represents the entire phase component of the modulation. *See McGhan*, paragraph [0011] (emphases added):

> the drive signals 10 in the form of amplitude and phase signal components $V_S(t)$ and $V_\phi(t)$ (each of which may be represented by a single signal or a differential signal pair), which are respectively used to drive the MZ modulator 4 and the phase shifter 22;

paragraph [0025] (emphases added):

> [t]he second basis set is a polar coordinate system, again sharing its origin with that of the E-field vector. In this polar representation, the E-field is decomposed into vector length (S) and phase angle ($\phi$) relative to the I direction;

and paragraph [0028] (emphases added):

> [i]n very broad terms, this can be accomplished by representing the total E-field E(t) of the recombined signal 8 in polar coordinates: that is, in terms of orthogonal phase $\phi(t)$ and amplitude S(t) components. Based on the known spectral performance of the MZ modulator 4, it is a simple matter to compute the voltage level $V_\phi(t)$ which, when supplied to both branches 22 of the MZ modulator 4, will produce the desired phase $\phi(t)$ component.

Therefore, even assuming, *arguendo*, that the phase shifter 22 in Fig. 2b of *McGhan* could be used to apply phase shifts of substantially equal magnitude (but not necessarily of equal sign) to a series of pulses received from the modulator 4, this would not produce the recitations of claim 16. This is because the phase shifter 22 is driven by the voltage $V_\phi(t)$, which is the

*entire* phase modulation component of the resulting signal 8. As a result, the phase shifter 22 cannot apply a phase shift with any properties determined as a function of a phase value of the received pulses, because the pulses received from the modulator 4 have not yet been subject to any phase modulation.

Therefore, independent claims 16 and 24 (containing similar recitations) are nonobvious and should be allowable over *McGhan*. In addition, dependent claims 17-20, 23, and 31 should also be allowable at least by virtue of their dependence from base claim 16 and because they recite additional features not taught or suggested in *McGhan*. Accordingly, Applicants respectfully request withdrawal of the rejection.

**Objection to Claims 21 and 22:**

Applicants respectfully request withdrawal of the objection to claims 21 and 22 at least because base claim 16 is allowable for the reasons just discussed.

**Allowed Claims 25-30 and 32:**

Applicants acknowledge with appreciation the Examiner's indication of allowable subject matter in claims 25-30 and 32.

**Conclusion:**

Applicants request reconsideration of the application and withdrawal of the objection and rejection. Pending claims 16-32 are in condition for allowance, and Applicants request a favorable action.

The Office Action contains a number of statements reflecting characterizations of the cited reference and related claims. Regardless of whether any such statements are identified herein, Applicants decline to automatically subscribe to any such statements or characterizations in the Office Action.

If there are any remaining issues or misunderstandings, Applicants request the Examiner telephone the undersigned representative to discuss them.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account no. 06-0916.

Respectfully submitted,

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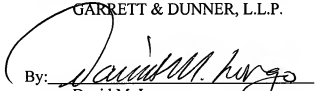
Dated: February 25, 2011

By: 

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